

## A new subspecies of the threatened monocalypt *Eucalyptus insularis* (Myrtaceae) from Western Australia

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### Abstract

Nicolle, D., Brooker, M.I.H. & French, M.E. A new subspecies of the threatened monocalypt *Eucalyptus insularis* (Myrtaceae) from Western Australia. *Nuytsia* 24: 249–253 (2014). Two subspecies are here recognised in the geographically rare and taxonomically isolated *Eucalyptus insularis* Brooker. *Eucalyptus insularis* subsp. *insularis* is known only from North Twin Peak Island in the Recherche Archipelago, about 90 km east-south-east of Esperance. *Eucalyptus insularis* subsp. *continentalis* D.Nicolle & Brooker *subsp. nov.* is known only from several small populations near Cape Le Grand on the mainland, about 25 km south-east of Esperance, and differs from the type subspecies in its low shrubby habit, smaller adult leaves with obscure tertiary venation and irregularly-shaped oil glands, more strongly pendulous inflorescences, and its generally smaller buds and fruits.

### Introduction

*Eucalyptus insularis* Brooker was first collected on North Twin Peak Island of the Recherche Archipelago, south of mainland Western Australia, by R.D. Royce of the Western Australian Herbarium in 1960. It has not been found on any other islands, despite numerous opportunistic flora collections and a dedicated eucalypt survey on eight of the other larger islands in the archipelago (including South Twin Peak Island) by two of us (DN and MEF) in 2003. It was not until ten years after Royce's 1960 collection that the species was discovered and collected on the Australian mainland, about 25 km south-east of Esperance near Cape Le Grand. The mainland populations are, by comparison, depauperate in habit compared to the island populations. More recently, cultivation trials of the island and the mainland populations at Currency Creek Arboretum ([http://www.dn.com.au/Currency\\_Creek\\_Arboretum.html](http://www.dn.com.au/Currency_Creek_Arboretum.html)) showed that the habit difference between the island and the mainland populations is maintained when cultivated under uniform environmental conditions (in a common garden), and also revealed a number of morphological differences between the island and the mainland populations. A subsequent study of leaf venation and oil gland characters in the eucalypts (Brooker & Nicolle 2013), revealed other recognisable differences between the two forms of *E. insularis*. All three of us have studied the island and the mainland populations in the wild.

### Key to the subspecies of *E. insularis*

1. Erect-stemmed mallee to 8 m tall; adult leaves 6–9 mm wide, tertiary venation visible, oil glands round [Recherche Archipelago]..... ***E. insularis* subsp. *insularis***
- 1: Spreading mallee to 3 m tall; adult leaves 3–6 mm wide, tertiary venation obscure, oil glands irregularly-shaped [mainland WA; Cape Le Grand NP]..... ***E. insularis* subsp. *continentalis***

### Taxonomy

***Eucalyptus insularis*** Brooker, *Nuytsia* 1(4): 308 (1974).

*Type*: ‘North Twin Peak Island, Recherche Archipelago, Western Australia (33°59’S, 122°51’E)’, 10 February 1960, *R.D. Royce* 6264 (*holo*: PERTH 01005480; *iso*: CANB).

*Mallee* 1.5 to 8 m tall; lignotuber present (resprouter). *Bark* sometimes rough and fibrous on the lower stems in larger plants of subsp. *insularis*, otherwise smooth throughout, grey-brown to tan over greenish to yellow-bronze, decorticating in strips. *Branchlets* not waxy, lacking pith glands. *Cotyledons* reniform. *Seedling leaves* initially opposite, sessile, ovate, slightly scabrid, discolourous, soon becoming alternate, shortly petiolate, narrow-elliptic, glabrous, concolorous, dull, green. *Adult leaves* alternate, petiolate, linear to lanceolate, often falcate, 18–65 mm long × 3–9 mm wide, concolorous, dull to slightly glossy, green to yellow-green; tertiary venation visible and sparse, or obscure; oil glands scattered to numerous, unconnected to vein network (island oil glands). *Inflorescences* held loosely erect to strongly pendulous, 9–20+-flowered; peduncles terete, slender, 3–8 mm long; pedicels terete, 2–4 mm long. *Flower buds* ovoid, smooth, 5–6 mm long × 3–4 mm diam.; opercula rounded to very bluntly conical, smooth; staminal filaments inflexed in bud, white at flowering; style long, straight; stigma blunt; ovules in 2 vertical rows on each placenta. *Fruits* barrel-shaped, smooth, 5–8 mm long × 4–7 mm diam., smooth; disc descending; valves 3, below rim level. *Seeds* dark brown, pyramidal to elongate.

*Diagnostic features*. Mallee habit. Adult leaves very small, thin, held more or less erect. Inflorescences 9–20+ flowered. Buds small, ovoid, with stamens inflexed. Ovules arranged in 2 rows on the placenta. Fruits small, barrel-shaped. The adult leaves of *E. insularis* subsp. *continentalis* are among the smallest in the genus.

*Notes*. *Eucalyptus insularis* is a taxonomically very isolated species, and although it is certainly a monocalypt (*E.* subgen. *Eucalyptus*), it has no known close relatives. Three other eucalypt species occur on North Twin Peak Island (*E. conferruminata* D.J.Carr & S.G.M.Carr subsp. *recherche* D.Nicolle & M.E.French, *E. cornuta* Labill. and *E. incrassata* Labill.), all of which are members of *E.* subgen. *Symphyomyrtus* (Schauer) Brooker and differ from *E. insularis* in numerous characteristics, including their much larger leaves, buds and fruits. Two other monocalypts occur in the Cape Le Grand area (*E. aquilina* Brooker and *E. ligulata* Brooker subsp. *ligulata*), both of which differ from *E. insularis* in numerous characteristics, including again their much larger leaves, buds and fruits. *Eucalyptus insularis* is not known to hybridise with any other species.

At the time of its description, Brooker (1974) tentatively suggested that *E. insularis* should be placed in a monotypic subseries within the monocalypts (*E.* subgen. *Eucalyptus*) and noted that the natural affinities of *E. insularis* are obscure, as it resembles closely no other eucalypt species. Subsequently,

Chippendale (1988) erected the monotypic *E. ser. Insulares* Chippendale to accommodate *E. insularis*. Brooker (2000) further emphasised what he considered to be the uniqueness of *E. insularis*, by placing it in the monotypic *E. subsect. Unicae* Brooker.

It is now considered that the Western Australian monocalypts can be taxonomically divided into two primary groups, *viz.* the tree species, which would be placed in an expanded *E. sect. Longistylus* Brooker, and the mallee species, which would be placed in an as-yet-unnamed section consisting of seven series. In this proposed classification, *E. insularis* would be placed in the monotypic *E. ser. Insulares*, following the placement of *E. insularis* by Chippendale (1988). The relationship of *E. ser. Insulares* to the other six series within this proposed section (namely, *E. ser. Calcicolae* Brooker, *E. ser. Diversiformes* Blakely, *E. ser. Muricatae* Maiden, *E. ser. Preissianae* L.D.Pryor & L.A.S.Johnson ex Brooker & Slee, *E. ser. Proximae* Brooker, and *E. ser. Subereae* Chippendale) has not been investigated, and it is therefore unclear which is most closely related to *E. ser. Insulares*.

### ***Eucalyptus insularis* Brooker subsp. *insularis***

*Illustration.* M.I.H. Brooker & D. Nicolle, *Atlas of Leaf Venation and Oil Gland Patterns in the Eucalypts*, p. 218, upper image only (2013).

*Diagnostic characters.* Erect-stemmed mallee to 8 m tall. Bark fibrous on the lower stems or smooth throughout. Adult leaves dull, green, 28–65 mm long × 6–9 mm wide, tertiary venation visible but sparse, oil glands round. Inflorescences held loosely erect to slightly pendulous. Flower buds 6 mm long × 3 mm wide. Fruits 6–8 mm long × 5–7 mm wide.

*Selected specimens.* WESTERN AUSTRALIA: [localities withheld for conservation reasons] 24 Apr. 1972, M.I.H. Brooker 3637 (AD, PERTH); 5 Mar. 2003, D. Nicolle 4586 & M.E. French (AD, CANB, PERTH); 21 Nov. 2006, L.S.J. Sweedman 7066 (PERTH).

*Distribution and habitat.* Restricted to North Twin Peak Island in the Recherche Archipelago, about 90 km east-south-east of Esperance, where it occurs on the granite shelves of one peak of the island, mainly on west-facing slopes, and occupying a total area of less than 1 km<sup>2</sup>. It occurs in dense whipstick stands, where it may dominate small areas. Commonly associated species include *Acacia heteroclita* subsp. *heteroclita* and *Eucalyptus conferruminata* subsp. *recherche*.

*Conservation status.* *Eucalyptus insularis* is listed as *Threatened* in Western Australia (Smith 2013). This conservation listing is also considered appropriate for *E. insularis* subsp. *insularis*. Although the total area of occurrence of the subspecies is less than 1 km<sup>2</sup>, it occurs in dense thickets on parts of the island, and the total number of individuals could be 1,000+. The entire population occurs in Recherche Archipelago Nature Reserve.

*Notes.* The larger habit and broader leaves of subsp. *insularis* most conspicuously, and most reliably, distinguish it from subsp. *continentalis*, although there are a number of other characteristics that distinguish the two subspecies (see *Diagnostic characters*, above).

### ***Eucalyptus insularis* subsp. *continentalis* D.Nicolle & Brooker, *subsp. nov.***

*Type:* near Mt Le Grand, Western Australia [precise locality withheld for conservation reasons], 29 July 2008, J.A. Cochrane 7109 & E. Adams (*holo:* PERTH 08022496; *iso:* K).

*Illustrations.* M.I.H. Brooker & D.A. Kleinig, *Field Guide to Eucalypts Vol. 2. South-western and Southern Australia*, 2<sup>nd</sup> edn., p. 83 all images (2001); M.I.H. Brooker & D. Nicolle, *Atlas of Leaf Venation and Oil Gland Patterns in the Eucalypts*, p. 218, lower image only (2013).

*Diagnostic characters.* Spreading mallee to 3 m tall. Bark smooth throughout. Adult leaves dull to slightly glossy, green to yellow-green, 18–60 mm long × 3–6 mm wide, tertiary venation obscure, oil glands irregularly-shaped. Inflorescences strongly pendulous. Flower buds 5–6 mm long × 3–4 mm wide. Fruits 5–8 mm long × 4–6 mm wide.

*Selected specimens.* WESTERNAUSTRALIA: [localities withheld for conservation reasons] 15 Mar. 1972, K.M. Allan 827 (PERTH); 22 June 1978, D.F. Blaxell 1686 (PERTH); 22 Apr. 1972, M.I.H. Brooker 3619 (AD, PERTH); 4 Apr. 1977, M.I.H. Brooker 5643 (PERTH); 18 Dec. 1979, M.I.H. Brooker 6704 (PERTH); 18 Dec. 1979, M.I.H. Brooker 6708 (PERTH); 15 Jan. 1985, M.I.H. Brooker 8787 (PERTH, AD, CANB); 3 June 1974, D.J. Carr & S.G.M. Carr 2019 (AD, PERTH); 20 Oct. 1995, J.A. Cochrane JAC 1609 (PERTH); 20 Oct. 1995, J.A. Cochrane JAC 1612 (PERTH); 29 July 2008, J.A. Cochrane & E. Adams JAC 7109 (PERTH); 3 May 1982, S.D. Hopper 2272 (PERTH); 3 May 1982, S.D. Hopper 2276 (PERTH); 9 Apr. 1983, S.D. Hopper 2738 (PERTH); 8 Dec. 1992, D. Nicolle 174 (AD); 22 Jan. 1996, D. Nicolle 1637 (AD); 15 Aug. 1992, I. Solomon 624 (PERTH); 9 Aug. 1971, A.L. Weston 6470.

*Distribution and habitat.* Known only from two or three populations over a linear range of a few kilometres in Cape Le Grand National Park, about 25 km south-east of Esperance. It occurs on granite slopes and ridges, on shelves below cliffs and between boulders on steep slopes. Commonly associated species include *Eucalyptus* aff. *lehmannii*, *Hakea drupacea* and *Melaleuca nesophila*.

*Conservation status.* *Eucalyptus insularis* is listed as *Threatened* in Western Australia (Smith 2013). This conservation listing is also considered appropriate for *E. insularis* subsp. *continentalis*. Although it appears to be known from only two or three populations, at least one of which consists of only about 12 individuals, an accurate survey of the populations of subsp. *continentalis* has not been undertaken by the authors. All the populations occur in Cape Le Grand National Park.

*Etymology.* The epithet is from the Latin *continentalis* (mainland, continent), in reference to the occurrence of the subspecies on the Australian mainland, compared to the island occurrence of the type subspecies.

*Notes.* The depauperate habit and smaller, narrower leaves of subsp. *continentalis* most conspicuously, and most reliably, distinguish it from subsp. *insularis*, although there are a number of other characteristics that distinguish the two subspecies (see *Diagnostic characters*, above).

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